



AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE		PAGE 1 OF 9 PAGES	
2. AMENDMENT/MODIFICATION NO. 004		3. EFFECTIVE DATE See Block 16c		4. REQUISITION/PURCHASE REQ. NO.	
5. PROJECT NO. (If applicable)		6. ISSUED BY U. S. Department of Energy National Energy Technology Laboratory P. O. Box 880, 3610 Collins Ferry Road Morgantown, WV 26505		7. ADMINISTERED BY (If other than Item 6)	
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State, and ZIP Code)  TBD		(✓) X		9A. AMENDMENT OF SOLICITATION NO. DE-BA26-99FT40274	
				9B. DATED (See Item 11) June 7, 1999	
				10A. MODIFICATION OF CONTRACT/ORDER NO.	
CODE		FACILITY CODE		10B. DATED (See Item 13)	

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

■ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers □ is extended, ☒ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning \_\_\_ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)  
N/A

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(✓)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor □ is not, □ is required to sign this document and return \_\_\_ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

A description of this amendment is described on Page 3.

End of Amendment 004

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Raymond D. Johnson Contracting Officer	
15B. CONTRACTOR/OFFEROR  (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA  /s/ Raymond D. Johnson BY (Signature of Contracting Officer)	16C. DATE SIGNED  January 19, 2000

## INSTRUCTIONS

Instructions for items other than those that are self-explanatory, are as follows:

- (a) Item 1 (Contract ID Code). Insert the contract type identification code that appears in the title block of the contract being modified.
- (b) Item 3 (Effective Date).
- (1) For a solicitation amendment, change order, or administrative change, the effective date shall be the issue date of the amendment, change order, or administrative change.
  - (2) For a supplemental agreement, the effective date shall be the date agreed to by the contracting parties.
  - (3) For a modification issued as an initial or confirming notice of termination for the convenience of the Government, the effective date and the modification number of the confirming notice shall be the same as the effective date and modification number of the initial notice.
  - (4) For a modification converting a termination for default to a termination for the convenience of the Government, the effective date shall be the same as the effective date of the termination for default.
  - (5) For a modification confirming the contracting officer's determination of the amount due in settlement of a contract termination, the effective date shall be the same as the effective date of the initial decision.
- (c) Item 6 (Issued By). Insert the name and address of the issuing office. If applicable, insert the appropriate issuing office code in the code block.
- (d) Item 8 (Name and Address of Contractor). For modifications to a contract or order, enter the contractor's name, address, and code as shown in the original contract or order, unless changed by this or a previous modification.
- (e) Item 9 (Amendment of Solicitation No.-Dated) and 10 (Modification of Contract/Order No.-Dated). Check the appropriate box and in the corresponding blanks insert the number and date of the original solicitation, contract, or order.
- (f) Item 12 (Accounting and Appropriation Data). When appropriate, indicate the impact of the modification on each affected accounting classification by inserting one of the following entries:
- (1) Accounting classification .....  
Net increase \$ .....
  - (2) Accounting classification .....  
Net decrease \$ .....
- NOTE: If there are changes to multiple accounting classifications that cannot be placed in block 12, insert an asterisk and the words "See continuation sheet."
- (g) Item 13. Check the appropriate box to indicate the type of modification. Insert in the corresponding blank the authority under which the modification is issued. Check whether or not contractor must sign this document. (See FAR 43.103.)
- (h) Item 14 (Description of Amendment/Modification).
- (1) Organize amendments or modifications under the appropriate Uniform Contract Format (UCF) section headings from the applicable solicitation or contract. The UCF table of contents, however, shall not be set forth in this document.
  - (2) Indicate the impact of the modification on the overall total contract price by inserting one of the following entries:
    - (i) Total contract price increased by \$ .....
    - (ii) Total contract price decreased by \$ .....
    - (iii) Total contract price unchanged.
  - (3) State reason for modification.
  - (4) When removing, reinstating, or adding funds, identify the contract items and accounting classifications.
  - (5) When the SF 30 is used to reflect a determination by the contracting officer of the amount due in settlement of a contract terminated for the convenience of the Government, the entry in Item 14 of the modification may be limited to -
    - (i) A reference to the letter determination; and
    - (ii) A statement of the net amount determined to be due in settlement of the contract.
  - (6) Include subject matter or short title of solicitation/contract when feasible.
- (i) Item 16B. The contracting officer's signature is not required on solicitation amendments. The contracting officer's signature is normally affixed last on supplemental agreements.

The purpose of this amendment is to provide additional background information, change the point of contact, modify the technical proposal instructions, amend the evaluation criteria, and notify the public that the Federal Energy Technology Center's (FETC) name has been changed to the National Energy Technology Laboratory (NETL).

Accordingly, the following changes are made to the solicitation:

**1. BACKGROUND, add the following text.**

"The fuel cell technology has immense and revolutionary technological potential and is capable of reaching even lower costs and higher efficiencies that make it suitable for deeper and broader market applications.

The vision and goal is to establish a DOE 21st Century Fuel Cell Program that results in fuel cell products with as low as \$100/kW fuel cell stack costs, as low as \$400/kW fuel cell system costs and/or as high as 80% (70% simple cycle) fuel-to-electric efficiencies for stationary applications in competitive, mature DG and bulk-power long-term Vision 21 markets applications.

In order to achieve these dramatic cost reduction goals for DG and Vision 21 applications, it is necessary to combine organizational strengths. Collaboration is encouraged and in the ideal, this will include industry, university, national laboratory and Government.

Organizations that apply for an advanced patent waiver will be asked to accept a provision requiring significant progress towards commercialization within five (5) years of contract award."

**2. SUPPLEMENTAL INFORMATION TO ASSIST POTENTIAL OFFERORS WHO INTEND TO RESPOND TO THIS BROAD AGENCY ANNOUNCEMENT, paragraph 5, is deleted in its entirety and the following paragraph is substituted in lieu thereof.**

"Included in this package are a number of documents which are to be included with each proposal. If further information is required concerning the completion of any of the documents, please contact Kelly McDonald at telephone number 304-285-4113 or Internet Address kmcdon@netl.doe.gov."

**3. SUPPLEMENTAL INFORMATION TO ASSIST POTENTIAL OFFERORS WHO INTEND TO RESPOND TO THIS BROAD AGENCY ANNOUNCEMENT, Section K is deleted in its entirety and the following paragraph is substituted in lieu thereof.**

**"K. Contracting Officer and Point of Contact**

"Raymond R. Jarr, Contracting Officer  
Kelly McDonald, Contract Specialist -- Point of Contact"

**4. OVERALL ARRANGEMENT OF PROPOSAL, VOLUME II, TECHNICAL PROPOSAL, Technical Proposal is deleted in its entirety and the following is substituted in lieu thereof:**

**"VOLUME II** (Original and six copies)  
**TECHNICAL PROPOSAL**

Technical Proposal:

Since the Technical Proposal will be evaluated to determine such matters as understanding of the work to be performed, technical approach, and potential for meeting the objective of the DOE, it should be specific and complete in every detail. The proposal should be practical and be prepared simply and economically, providing a straightforward, concise delineation of what it is the Offeror will do to address the DOE need.

The executive summary should include a brief consolidated discussion permitting readers to quickly comprehend your technical approach and merits of the technology. The executive summary shall not exceed two pages.

The public abstract shall contain not more than 500 words describing the proposed project, the objective, methodology, sponsoring organization(s), and time frame. Not more than two 8-1/2 by 11-inch diagrams may be included with the abstract. The abstract must provide an overview of the proposed project. This abstract may be released to the public by DOE in whole or in part at any time. It is, therefore, required that it shall not contain proprietary data or confidential business information.

In order that the Technical Proposal may be evaluated strictly on the merit of the material submitted, **no contractual cost information is to be included in the Technical Proposal**. Indication of cost share contribution is considered as cost information. Where estimated man-hours will provide clarity, they shall be quoted in man-hour figures only, with no indication as to the cost of these man-hours.

The Technical Proposal shall not exceed 50 pages, excluding appendices (statement of work, resumes, and additional publications). For interpretation of page guidelines, the front and back of a single sheet are counted as two pages. The proposed text shall be typed, single spaced, using Elite size (12 pitch) type (or equivalent) and printed, unreduced on size 8 1/2-inch by 11-inch paper. Illustrations shall be legible and no longer than 11-inch by 17-inch fold-outs, as appropriate for the subject matter. Each 11-inch by 17-inch fold-out is considered two pages when determining the number of pages. Pages of each volume shall be sequentially numbered with the volume and page numbers on each page. No material may be incorporated in any proposal by reference as a means to circumvent the page limitation.

The technical proposal consists of the Offeror's outline addressing the technical and management aspects of one specific technology need area.

#### Format and Content

In order to produce a comprehensive proposal for this BAA, the Offeror should address, at a minimum, the areas listed below. To help facilitate the review process and to insure addressing all the review criteria, the Offeror shall use the following Table of Contents.

The following Table of Contents shall be used to prepare technical proposal.

<u>TABLE OF CONTENTS</u>	<u>Page</u>
PUBLIC ABSTRACT .....	i
Table of Contents .....	ii
List of Tables .....	iii
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Executive Summary .....	vi
 1. TECHNICAL APPROACH, UNDERSTANDING, AND MERIT OF TECHNOLOGY	
1.1 Explain materials and component development .....	1
1.2 Explain material selection strategies .....	#
1.3 Explain material synthesis strategies .....	#
1.4 Describe material testing plans .....	#
1.5 Describe component selection strategies, design and attributes .....	#
1.6 Describe component fabrication .....	#
1.7 Describe component testing and evaluation .....	#
1.8 Discuss cost estimating and risk .....	#
1.9 Show and discuss scheduling .....	#

2.	TECHNOLOGY TRANSFER AND COLLABORATION STRATEGIES .....	#
2.1	Explain technology transfer strategies .....	#
2.2	Discuss collaboration .....	#
2.3	Explain contribution for setting standards .....	#
2.4	Integrated stack developers shall explain vertical and/or horizontal integration organization structure .....	#
3.	BUSINESS MANAGEMENT APPROACH AND PERSONNEL QUALIFICATIONS .....	#
3.1	Present organization's business management philosophy and management strategy .....	#
3.2	Discuss manufacturing concept and adaptability .....	#
3.3	Provide alternative strategies for achieving acceptance .....	#
3.4	Discuss relevant organization experience .....	#
3.5	Discuss relevant experience of key personnel .....	#
3.6	Show ability to develop an applied research plan .....	#
3.7	Demonstrate capability to manage and execute a project plan .....	\$
3.8	Discuss experience in designing ceramic components .....	#
3.9	Explain experience in manufacturing in general and with ceramic components specifically .....	#
4.	FACILITIES AND EQUIPMENT .....	#
4.1	Discuss the type, quality, availability, and appropriateness of facilities/equipment .....	#

#### APPENDICES

A.	STATEMENT OF WORK .....	A1
B.	RESUMES .....	B1
C.	ADDITIONAL PERTINENT PUBLICATIONS (if any) .....	C1

#### Technical Proposal General

This section shall describe the offeror's technical approach to accomplish the work.

The offeror shall provide a statement of work (SOW) which shall be divided into logical tasks and subtasks necessary to accomplish the project objective(s). Every task will be given a unique numeric identification regardless of phases or options proposed. The SOW shall include, where applicable, key go/no-go decision points (it is understood that because of the nature of the work proposed that some, though few, will not lend themselves to go/no-go decision points) which will be used to evaluate project success. These decision points may be identified as options in any resulting contract. The offeror shall identify specific success criteria which must be satisfied to demonstrate success for each key go/no-go decision point. A sample Statement of Work is included as Attachment A to this solicitation.

Describe the specific multi-layer ceramic manufacturing process proposed. Discuss relevant high temperature solid state electrochemical theory. Explain uniqueness of the approach for the proposed method of applying multi-layer ceramic technology to the challenge of manufacturing low cost high performing cell/stack, tube/bundle, or other configurations. Present the rationale for the recommended cell/tube configurations by including projected manufactured cost and reliability, availability and maintenance factors, and because of any other supporting factors the proposer wishes to suggest. Demonstrate an understanding of appropriate application of cell/tube modeling for design purpose (i.e., predictive engineering analysis of electrochemistry, flow, structures, and heat transfer). Discuss capability for executing a manufacturing cost evaluation. Demonstrate an understanding of ceramics material needs relative to ease of manufacturing and component performance. Demonstrate an understanding of the ceramics manufacturing process proposed as well as cell component assembly (to build up a stack or bundle) requirements. Demonstrate an understanding of ceramics component testing methodologies including destructive, non-destructive and electrochemical performance testing. NOTE: Offer is not required to be

an integrated stack developer. Proposals that are focused on new or improved single manufacturing process will be allowed. However, when relevant the offer shall show an understanding of the relationship between component manufactured or integrated stack.

NETL anticipates proposals of high technical and scientific quality that have as the primary focus, the refining and improving a multi-layered ceramic manufacturing technology so that it may be applied to manufacture of fuel cell electrochemical packages (i.e., anode electrode, electrolyte, and cathode electrolyte). NETL also anticipates proposals, which indicate competence to manage an aggressive bench scale cell package test program whether internal or externally executed. Testing should include destructive, non-destructive and electrochemical. NETL also anticipates proposals showing competence to manage the internal or external execution of manufacturing cost analysis competitive solid state fuel cell configurations. The purpose for manufacturing cost estimating is to show the competitiveness of the proposed manufacturing process as applied to a specific configuration(s). NETL also anticipates proposals showing business development competence to maximize the probability that successful technical development will result in commercial use.

A. Technical Approach, Understanding, and Merit of the Technology (Relative weight of 40%)

*MATERIALS AND COMPONENT DEVELOPMENT*

Explain in brief succinct language why the research proposal is focussed on materials, on components, or on both materials and components. Summarize the selection, development and test qualification strategies in a manner that succinctly shows their relationship to the research focus (materials or components or both).

*MATERIAL DEVELOPMENT*

Material Selection. Explain materials selection strategies, including logical alternatives. Provide a physical description of candidate materials including operating temperature ranges, bulk densities, etc. Discuss current and future availability and cost of candidate materials. Describe the relationships or links between materials selected and their targeted use in a manufacturing operation or in a component fabrication.

Material Synthesis. Explain materials processing/synthesis strategies including process yield estimates, projected ability to tailor the material to match component fabrication method or manufacturing operation, and any other relevant material development and synthesis issue.

Material Testing. Describe tests to be conducted to determine materials for microstructure and interfaces, thermal and mechanical properties, electrical and electrochemical properties, or any other significant physical requirements relative to use in or on targeted component(s).

*COMPONENT DEVELOPMENT*

Component Selection. Describe component selection strategies, design, and attributes. Include both favorable and unfavorable attributes. Explain any related materials synthesis and performance issues. Explain materials readiness to accommodate needs of mass production processes.

Component Fabrication. Describe component scalability, potential for low-cost manufacturing, requirements for low cost mass production. Describe component manufacturing processes and discuss setting specifications for components produced. Discuss projected component yields and describe quality control strategies to meet yield projections and component specifications.

Component Testing and Evaluation. Describe component or cell-stack testing and validations strategies. Demonstrate an understanding of ceramics component testing methodologies including destructive, non-destructive and electrochemical performance testing. If necessary, show the strategy for soliciting this capability, either through collaboration, or through "for fee" approaches. Demonstrate an understanding of manufacturing quality control requirements relative to the methods, materials, and components necessary to the manufacturing

processes proposed. Demonstrate an understanding of when and how to incorporate cell/tube modeling for design purpose (i.e., predictive engineering analysis of electrochemistry, flow, structures, and heat transfer applied to appropriate level of detail at appropriate project phase).

#### *COST ESTIMATING AND RISK*

Discuss capability for executing a manufacturing cost evaluation or the strategy for soliciting this capability. Explain how the manufacturing cost evaluation will be used to guide design of components and manufacturing processes. If the proposal addresses improvement in materials synthesis only, or if the proposal addresses only one of many manufacturing operations, or if the proposal only addresses improvement in a single component, clearly show the cost benefit in a strategic sense (i.e., Show how the improvement will contribute to the programmatic goal of \$100/kW solid oxide fuel cell costs). Give an estimate of the probability for achieving projected cost estimates as well as an estimate of project risk. In the risk assessment, include major challenges and barriers to be overcome to achieve the schedule described below.

#### *SCHEDULING*

Show and discuss the time interval between phases for materials development or for component development (or both when appropriate). For joint materials and component development phases, show the time dependent and time sequencing relationship between the phases.

#### *ADVANCED CONCEPTS AND UNIQUENESS*

Show uniqueness of the proposed research and the degree to which the proposal represents an advanced concept consistent with the objectives of this solicitation.

#### *RANGE OF APPLICABILITY*

Show the broadest possible product application for each material and each manufacturing process or operation (for material synthesis, component treatment, or component fabrication). Show that materials, materials to component synthesizing processes and manufacturing operations on a component have broad application. Otherwise, justify narrow applicability. For example, if the manufacturing operation is a coating process, application to multiple current and projected cell-stack component designs or configurations would be well received. Application in other technologies would be well received.

#### *B. Technology Transfer and Collaboration Strategies (Relative weight 30%)*

Explain how intellectual property will be managed, promulgated, licensed, etc. Explain the collaboration strategy, which in the optimum, includes national labs, universities, industry, both federal and local Government, and end users. Explain the strategy for supporting the fuel cell community to promulgate common standards for the manufacturing process (or processes) and testing proposed. Proposals in which the offeror aspires to be integrated stack manufacturers shall show how the proposed collaborations and organizational structure activities are vertically or horizontally integrated (or both) for purpose of eventual success in commercializing the process or stack design.

#### *C. Business Management and Personnel Qualifications (Relative weight 15%)*

Present business management philosophy and management strategy. Give detailed attention to the following when applicable: strategy for minimizing personnel turnover rate, marketing competency, strategy for capturing market share, strategy for maximizing U.S. benefit or return on investment, and financing strategy. Provide an estimate of how broadly the proposed manufacturing concept will be used (by market size and by its adaptability for use with different fuel cell configurations) and provide alternative strategies for achieving broad acceptance and use of the concept including a technology and information transfer strategy.

Discuss relevant organizational experience. Discuss relevant experience of key personnel. Show ability to develop an applied research project plan. Demonstrate the capability to manage and execute a project plan. Discuss experience in designing ceramic components. Explain experience in manufacturing in general and with ceramic components specifically.

D. *Facilities and Equipment* (Relative Weight of 15%)

Provide a discussion of the type, quality, availability, and appropriateness of the proposed facilities and equipment, including a description of any facilities and/or non-monetary resources requested to be furnished by the Government for use by the offeror in performance of the proposed research."

**5. OVERALL ARRANGEMENT OF PROPOSAL, Evaluation Criteria, paragraph A, Technical Evaluation Factors are deleted in their entirety and the following is substituted in lieu thereof:**

"The following factors will be used for the evaluation of proposals submitted under this solicitation:

Criterion 1 (40 Points) -- Technical Approach, Understanding, and Merit of the Technology

The focus of the research is clear and the strategic interrelationships between material development and component development needs are understood. Material selection strategies, understanding of material availability and cost (current and projected) are comprehensively understood. The relationships between candidate materials and component fabrication processes are clearly detailed and logical. Material processing and synthesis strategies are clearly detailed and logical. Testing strategies to establish targeted physical characteristics of candidate materials are described in detail and indicate a coherent and comprehensive understanding of ceramics. Testing strategies support the research proposed. Component selection strategies, proposed designs, and attributes are detailed and sensible. Related materials synthesis and performance issues are understood. Materials chosen will accommodate the needs of mass production processes and mass production processes are identified and sufficiently defended. Challenge of component scalability and for achieving low-cost manufacturing mass production is understood. Specifications for components to be produced (or strategies to develop these specifications) are detailed and logical. Preliminary targets for component yields are detailed and the basis for the projections is reasonable. Probability to achieve component fabrication goals, and longer term mass production quality and cost targets, is reasonable. Component (or bench scale cell-stack when appropriate) testing and validation strategies are detailed and indicate a clear understanding of various necessary testing approaches and protocols. Incorporating computer aided design and modeling within the selection, development and evaluation stages of the project are clearly explained and logical. Relative to project phase, the need for more or less computer modeling detail is clearly understood. Anticipated desirable, but missing, analytical models are identified and strategies to fill this need is adequately described. The purpose of and use of manufacturing cost evaluation as a decision making and validation tool is clearly understood. The strategy for employing this tool is logical. Considering the information available when the proposal was submitted, preliminary cost targets are reasonable. The discussion of risk in achieving the cost goals is reasonable. The cost benefit justification for the research proposed is very convincing. The research proposed has broad application for purpose of supporting development of oxide fuel cells. There is potential for the proposed research to significantly benefit non-fuel cell technologies. Within the oxide fuel cell technologies, the research, especially materials synthesis and manufacturing fabrication processes, have potential for broad application relative to various alternative designs and cell-stack configurations, current and projected.

Criterion 2 (30 Points) -- Technology Transfer and Collaboration Strategies

A sound plan is evidenced for managing the intellectual property to ensure broad U.S. availability of improvements in the art developed. This includes a reasonable strategy for marketing the technology, and a sound and fair plan for sharing the intellectual property rights among the team members. A strategy for optimizing the opportunity for collaboration is provided and the collaboration strategy, in the ideal, includes national labs, universities, industry, federal and local Government, and end users. The strategy for participating in or otherwise supporting promulgation of common standards for the manufacturing process (or processes) and for testing fuel cell components and stacks is reasonable. For proposals with integrated stack designs, the horizontal or vertical (or both) integration strategy clearly defends a high probability for commercial success of the stack design proposed.



Criterion 3 (15 Points) -- Business Management and Personnel Qualifications

The organization's vision and management philosophy, mechanisms to minimize personnel turnover, strategies for seeking financing, strategies for business development including marketing and sales strategies are reasonable. The organization has the talent (or understands how to acquire it) and necessary strategies for achieving broad acceptance and use of the concept proposed. The organization's technology transfer strategy is appropriate and sound. Organizational experience in comparable endeavors is reasonable. Relevant experience of key personnel is adequate. Strategy and experience in collaboration ventures is evidenced. Competency and experience in project planning and management are reasonable. Technical experience of personnel is evident and adequate.

Criterion 4 (15 Points) -- Facilities and Equipment

The quality and adequacy of existing facilities and equipment is evident. Possession of multi-layer ceramics manufacturing equipment, or a reasonable plan for acquiring the same, is evidenced. Necessary equipment for bench and pilot scale, destructive, non-destructive and electrochemical component testing is available, or alternatively, a sound plan for acquiring the necessary equipment or for contracting for the testing services is presented."

End of Amendment 004